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USE OF ELECTRON BEAM PHYSICAL VAPOR DEPOSITION (EBPVD) FOR RAPID TOOLING AND NET SHAPE FORMING

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Over the past two years we have been developing an electron beam physical vapor deposition process for making industrial tooling and near net shape parts for the weapons complex. In the former application a metallic vapor is deposited on a mandrel in the shape of the object to be produced. When the condensate thickness approaches an inch the vaporization is stopped and the mandrel and deposit removed from the vacuum vessel. The condensate is separated from the mandrel and mounted onto a block for use in a plastic injection molding machine. This technique was used to produce a mold insert which was used to successfully produce 5000 small plastic toy parts. In addition, an attempt was also made to apply this technique to the light metal die casting industry. Finally we have made substantial progress in vaporizing a uranium alloy to make net shape weapons components which require little post machining. This application has the potential to reduce the scrap waste from machining by a factor of 30. All three of these applications will be discussed.

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